

IN THE CLAIMS

In claim 1, line 4, change "against the liquid" to -- against the workpiece --. Claim Sheet
Marked Up To Show Changes and a Clean Set of Claims is enclosed.

Respectfully submitted,

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Claim Sheet Marked Up To Show Changes

- [0001] 1. A method for cleaning a flat media workpiece comprising the steps of:
- placing the workpiece into a chamber;
 - pressurizing a liquid;
 - directing a jet of the pressurized liquid [against the liquid] against the workpiece to
- physically dislodge a contaminant on the workpiece.

Clean Set of Claims

- [0001] 1. A method for cleaning a flat media workpiece comprising the steps of:
placing the workpiece into a chamber;
pressurizing a liquid;
directing a jet of the pressurized liquid against the workpiece to physically dislodge a
contaminant on the workpiece.
- [0002] 2. The method of claim 1 where the liquid comprises water.
- [0003] 3. The method of claim 1 where the liquid is pressurized to about 100-15,000psi.
- [0004] 4. The method of claim 1 where the liquid is pressurized to about 400-800psi.
- [0005] 5. The method of claim 1 further comprising the step of heating the liquid.
- [0006] 6. The method of claim 1 further comprising the step of providing ozone into the
chamber.
- [0007] 7. The method of claim 1 where the liquid comprises an organic solvent.
- [0008] 8. The method of claim 1 further comprising the step of introducing steam onto the
workpiece.
- [0009] 9. The method of claim 2 where the liquid further comprises a member selected from the
group consisting of hydrofluoric acid, hydrochloric acid, ammonium hydroxide, and hydrogen
peroxide.
- [0010] 10. The method of claim 1 where the liquid comprises a member selected from the group
consisting of sulfuric acid, phosphoric acid, and halogenated hydrocarbons.
- [0011] 11. The method of claim 1 further comprising the step of irradiating the workpiece with
electromagnetic energy.

- [0012] 12. The method of claim 11 wherein the electromagnetic energy comprises a member selected from the group consisting of ultraviolet , infrared , microwave, gamma or x-ray radiation.
- [0013] 13. The method of claim 1 further comprising the step of moving the jet of pressurized liquid relative to the workpiece, so that substantially all areas of the workpiece surface facing the jet are exposed at least momentarily to the jet.
- [0014] 14. The method of claim 1 where the jet is perpendicular to the workpiece.
- [0015] 15. The method of claim 13 further comprising the steps moving the jet within the chamber, and rotating the workpiece.
- [0016] 16. The method of claim 15 where the workpiece is rotated at about 100-2000rpm.
- [0017] 17. The method of claim 13 further including the step of moving the jet on a swing arm within the chamber.
- [0018] 18. The method of claim 1 further including the step of introducing hydrogen into the chamber.
- [0019] 19. The method of claim 1 further comprising the step of introducing sonic energy to the workpiece.
- [0020] 20. The method of claim 19 where the sonic energy is introduced to the workpiece by a sonic transducer in the chamber and in contact with the workpiece.
- [0021] 21. The method of claim 19 where the sonic energy is introduced to the workpiece by introducing sonic energy into a nozzle forming the liquid into the jet.
- [0022] 22. The method of claim 1 further comprising the step of cooling the liquid to a temperature below ambient, to increase the density of the liquid and the energy imparted to the workpiece as the jet of liquid contacts the workpiece.

- [0023] 23. The method of claim 1 where the jet has a diameter of from about .5-10 mm.
- [0024] 24. The method of claim 1 where the workpiece has a top surface and a bottom surface, and where the jet is directed from below against the bottom surface.
- [0025] 25. The method of claim 13 where the relative movement occurs at a rate of from about .5 – 500 linear mm per second.
- [0026] 26. A method for cleaning a flat workpiece comprising the steps of:
directing the ¹¹²jet relative to the workpiece so that substantially all of the workpiece surface is impacted, at least momentarily, by the jet, to physically remove a contaminant from the surface; and
providing ozone around the workpiece.
- [0027] 27. The method of claim 26 where the ozone is provided by placing the workpiece into a chamber and supplying ozone gas into the chamber.
- [0028] 28. The method of claim 26 where the ozone is provided by supplying ozone into the liquid forming the jet.
- [0029] 29. The method of claim 26 further comprising heating the workpiece.
- [0030] 30. The method of claim 29 where the heating is performed by heating the liquid forming the jet.
- [0031] 31. The method of claim 29 where the heating is performed by introducing steam to the workpiece.
- [0032] 32. An apparatus for removing contaminants from a workpiece comprising:
a process chamber;
a fixture in the chamber for holding a workpiece at a workpiece position;

at least one nozzle in the chamber directed towards the workpiece position;
a nozzle driver attached, at least indirectly to the nozzle, for moving the nozzle relative to the workpiece position; and

a high pressure liquid source connected to the nozzle.

[0033] 33. The apparatus of claim 32 where the high pressure liquid source provides liquid to the nozzle at a pressure of from 400-800 psi.

[0034] 34. The apparatus of claim 32 further including a steam supply connected to the process chamber.

[0035] 35. The apparatus of claim 32 further including an ozone supply connected to the process chamber.

[0036] 36. The apparatus of claim 32 further including fixture rotor attached to the fixture for rotating the fixture within the chamber.

[0037] 37. The apparatus of claim 32 where the nozzle driver comprises a swing arm supporting the nozzle and an actuator attached to the swing arm.

[0038] 38. The apparatus of claim 32 further including a heater for heating the liquid.